

REMARKS

Claims 1-22 are pending in the present application. Claims 1, 2, and 9-13 are amended. Claim 23 is cancelled. Claim 1, which is representative of similar subject matter of claim 12, is amended to recite features of receiving a write operation command to write data in a data location, performing an instant copy operation to copy data from a data location, and updating the pointer to one of original data or new data in the data location. Reconsideration of the claims is respectfully requested.

Amendments were made to the specification to correct errors and to clarify the specification. No new matter has been added by any of the amendments to the specification.

Also, Applicants have submitted proposed corrections to drawings labeled Figures 2, 3, 6, 8-10, 14, 15, 18B, 19, 20A, 20B, 21-23, 24A-C, and 25A-B as suggested by the Examiner in red ink. These changes will be incorporated into a formal set of drawings upon approval of the proposed changes by the Examiner.

I. Obviousness-type Double Patenting

The Examiner has rejected claims 1-22 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable in view of claims 1-22 of copending Application No. 09/884,684, which was filed June 19, 2001. Applicants have submitted herewith a terminal disclaimer under 37 CFR § 1.321, thus obviating the double patenting rejection. Applicants respectfully request that the rejection be withdrawn.

II. 35 U.S.C. § 112, Second Paragraph, Claims 1-22

The Office Action rejects claims 1-22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter, which Applicants regard as the invention.

The Examiner states in the Office Action that it is not entirely clear in independent claims 1 and 12 how an "operation" itself is to be received. The Examiner also states that it is not clear what is meant by performing an instant copy "on" a data location. By this response, independent claims 1 and 12 are amended to recite,

"receiving a write operation command to write data to a data location" as suggested by the Examiner. Claims 1 and 12 are also amended to recite, "performing an instant copy operation to copy data from the data location. In addition, claims 9, 10, and 11 are amended to connect and relate features of the "pointer" to the features of "instant copy operation" as recited in independent claim 1. Therefore, Applicants respectfully request withdrawal of the rejections to claims 1-22 under 35 U.S.C. § 112, second paragraph.

III. 35 U.S.C. § 102, Alleged Anticipation, Claims 1-22

The Examiner has rejected claims 1-22 under 35 U.S.C. § 102 as being anticipated by *Belsan et al* (U.S. Patent No. 5,403,639). This rejection is respectfully traversed.

As to independent claims 1 and 12, the Office Action states:

Belsan discloses a method and apparatus for performing an "instant" copy of data including receiving a write operation to a data location in one of an initial physical storage area and an additional physical storage area, and performing an "instant" copy operation "on" the data location, where the "instant" copy operation includes generating a pointer to one of the new data and original data in the data location (see column 19, lines 50-58). Belsan also teaches that new or modified data may be written to a new (additional) data location in accordance with a write operation (see column 19, line 68 to column 20, line 14, e.g.). Also with respect to claim 12, Belsan teaches that the method may be implemented using software or a "computer program product" (see column 11, lines 39-54; column 20, lines 14-28; and column 21, lines 5-16, e.g.) which one of ordinary skill in the art would appreciate is stored in/on a computer readable medium such as a hard disk drive.

(*Office Action*, dated May 7, 2003, pages 16-17).

Amended independent claim 1, which is representative of similar subject matter of amended independent claim 12, now recites:

1. A method of performing an instant copy of data, comprising:
receiving a write operation command to write data to a data location in one of an initial physical storage area and an additional physical storage area;
performing an instant copy operation to copy data from a data location;
and
writing new data to the data location in accordance with the write operation, wherein the instant copy operation includes generating a pointer to one of the new data and original data in the data location; and

in response to writing new data to the data location, updating the pointer to one of the original data or new data in the data location.

A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 21 U.S.P.Q.2d 1031, 1034 (Fed Cir. 1994). Applicants respectfully submit that *Belsan* does not teach every element of the claimed invention arranged as they are in amended claims 1 and 12. Specifically, *Belsan* does not teach updating the pointer to one of the original or new data in the data location in response to writing new data to the data location.

Belsan teaches a system that manages synchronization of data that is completely transparent to the host computer by using a snapshot application data group. The snapshot application data group allows the end user to define a set of data sets or databases that must be synchronized in time. The *Belsan* system creates copies of data records instantaneously by replicating pointers. The pointer is replicated from the mapping table that points to the original data and assigns a new virtual address to the replicated pointer to allow access to the original data at two different virtual addresses. A physical copy of original data record is copied only when the data processor makes changes to the original data record or for backup purposes. The two different pointers will always reference the same physical copy of data via different logical copies.

Thus, *Belsan* teaches that a copy of pointers is made to access the same physical data with two different virtual addresses. This is similar to the "data file snapshot copy" prior art example discussed on page 3 in the Background section of the present specification. This snapshot copy manipulates the mapping table to allow the processor to access data file via two virtual track addresses, while only a single physical copy of data file resides on the back-end data storage devices. Thus, the *Belsan* reference contains disadvantages not found in the present invention, for a system administrator still has to specifically plan for and request execution of these copies at the host level.

The present invention solves this problem by creating a pointer to the original data map (where the physical storage location used to store the original data is identified)

in the copy data map. The pointer in the copy data map relating only to those sections that change as write activity occurs is then modified with addition information, (e.g., meta-data). The pointer created in the copy data map reduces the amount of storage space required to make instant copy since a complete duplicate of the original data map is not required. The pointers are generated in the copy data map for a write operation command to new and original data that is stored in initial and additional physical storage location. Instead of duplicating the pointers in the copy data map, as *Belsan* teaches, the pointers are updated to point to the new or original data in the physical storage location. *Belsan* does not teach such features. That is, with regards to claim 1 and 12, *Belsan* does not teach updating the pointer to one of the new or original data in the data location.

Furthermore, *Belsan* does not teach, suggest, or give any incentive to make the needed changes to reach the presently claimed invention. *Belsan* actually teaches away from the presently claimed invention because it teaches replicating original pointers from the mapping table to point to a single physical storage location where the original data is stored instead of generating a pointer to point to original pointer and updating the pointer to point to new and original data in the data location, as in the presently claimed invention. In addition, the *Belsan* system teaches away from features recited in claims 1 and 12 since *Belsan* explicitly teaches that the pointers are replicated to copy data instantaneously. The *Belsan* system replicates the original pointer from the mapping table to point to the original data and assign the replicated pointer a different virtual address, as opposed to the claimed invention where pointer is created to point to the original pointer from the mapping table and newly created pointers in the mapping table are updated to point to the new and original data in the data location. Absent the Examiner pointing out some teaching or incentive to implement *Belsan* in this manner, one of ordinary skill in art would not be led to modify *Belsan* to reach the present invention when the reference is examined as a whole. Thus, the presently claimed invention can be reached only through an improper use of hindsight using the Applicant's disclosure as a template to make the necessary changes to reach the claimed invention.

Therefore, Applicants respectfully submit that *Belsan* does not teach each and every feature of claims 1 and 12. At least by virtue of their dependency on claims 1 and 12, *Belsan* does not teach each and every feature of dependent claims 2-11, 13-22.

Accordingly, Applicants respectfully request withdrawal of the rejection of claims 1-22 under 35 U.S.C. § 102.

Furthermore, *Belsan* does not teach the specific features recited in dependent claims 2-11, 13-22. For example, with regard to dependent claims 10 and 11, the Office Action states:

Belsan teaches that access information as well as length information may be stored in a meta data-data structure, and also teaches that the pointer may be stored in a pointer table of meta-data having a plurality of pointers, where the plurality of pointers include a pair of pointers representing a range (or extent) of pointers that point to portions of original data that have not been changed by a write operation (see column 5, lines 3-7 and column 6, lines 16-18, e.g.)

(*Office Action*, page 18).

Amended claims 10 and 11, which are representative of similar features in claims 21 and 22, read as follows:

10. The method of claim 8, wherein the instant copy operation includes storing a pointer and an associated size of the portion of original data in a meta-data data structure. (emphasis added)

11. The method of claim 1, wherein the instant copy operation includes storing a pointer in a pointer table of meta-data having a plurality of pointers, and wherein the plurality of pointers include a pair of pointers representing a range of pointers that point to portions of original data that have not been changed by a write operation. (emphasis added)

Belsan does not teach storing a pointer and an associated size of the portion of original data in a meta-data data structure as recited in claim 10. *Belsan* only teaches in the reference above the meta-data is corrected for accessing the data, such as the volume table of contents. The volume table of contents that *Belsan* teaches contains the source volume and snapshot volume that contains the replicated pointers. However, *Belsan* does not teach or suggest storing an associated size of the portion of original data in a meta-data structure. *Belsan* actually teaches away from the claim invention in that meta-data structure stores access information to the data such as source volume number, snapshot volume number and number of segments etc., as opposed to storing a pointer and an

associated size of portion of the original data in the meta-data structure, as recited in claim 10.

Furthermore, *Belsan* does not teach a pointer table of meta-data having a plurality of pointers, and wherein the plurality of pointers include a pair of pointers representing a range of pointers that point to portions of original data that have not been changed by a write operation as recited in claim 11. *Belsan* fails to mention or suggest a pair of pointers representing a range of pointers that points to portions of original data in a pointer table of meta-data. To the contrary, *Belsan* replicates all the pointers from the mapping table that points to original sets of data, not a range of pointers as recited in the claim invention. As discussed above, the meta-data structure of *Belsan* includes only access information to the original data such as source volume, snapshot volume and number of segment etc. Thus, *Belsan* does not teach a meta-data structure that includes a pair of pointers representing a range of pointers that point to portions of original data, as recited in claim 11.

Accordingly, Applicants respectfully request withdrawal of the rejection of claims 1-22 under 35 U.S.C. § 102.

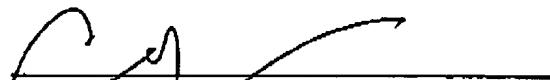
IV. Conclusion

It is respectfully urged that the subject application is patentable over *Belsan et al.* and is now in condition for allowance.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,



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